

## CHAPTER 4. SURFACING

- 4.01 Residential Streets, Pedestrian and Bike: The minimum paved section, with alternative combinations of materials, for residential streets, shoulders, sidewalks and bikeways shall be as indicated below. These sections are acceptable only on visually good, well-drained, stable compacted subgrade. Any proposed exception to these materials will be subject to soils strength testing and traffic loading analysis and subject to review and approval by the Engineer as outlined in Section 4.02 below. All expenses for determining revised materials shall be borne by the Developer.

TYPE OF FACILITIES	ASPHALT CONCRETE	ASPHALT TREATED BASE	BITUMINOUS SURFACE TREATMENT	CRUSHED SURF. TOP COURSE	CRUSHED SURF. BASE COURSE	PORTLAND CEMENT CONCRETE
<b>A. RESIDENTIAL ACCESS STREETS</b>						
<b>Alternative I</b> . . . . .	2" (3"*)	4"				
<b>Alternative II</b> . . . . .	2" (3"*)			1½"		.5"
<b>Alternative III</b> (Acceptable for rural areas, transitional areas, and designated agricultural production districts only, on grades not steeper than 12 percent) . . . . .			Class A	1½"		.5"
<b>Alternative IV</b> . . . . .						Class 4000, 7" (8"*)
<b>Alternative V</b> (Acceptable on rural minor access streets) . . . . .				1½"		2½"
*On neighborhood collectors						
<b>B. SHOULDERS</b>						
<b>Alternative I</b> . . . . .	2" (3"*)	4"				
<b>Alternative II</b> . . . . .	2" (3"*)			1½"		2½"
<b>Alternative III</b> . . . . .			Class A	1½"		2½"
<b>Alternative IV</b> . . . . .				1½"		2½"
*On bus routes						
<b>C. SIDEWALKS</b>						
<b>Alternative I</b> (Acceptable except behind rolled curb) . . . . .						Class 3000, 4"

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#### Alternative II

(Mandatory behind rolled curb)

Class 3000, 5"

#### D. WALKWAYS & BIKEWAYS

Alternative I . . . . . 2" . . . . . 1½" . . . . . 2½"

Alternative II . . . . . 3½"

Alternative III . . . . . Class A . . . . . 1½" . . . . . 2½"

Alternative IV . . . . . Class 3000, 5"

Alternative V (may be used as shown on Dwg. No. 1-005 and 1-006 or where approved by Reviewing Agency). . 2"

When a walkway or bikeway is incorporated into a road shoulder, the required shoulder section, if higher strength, shall govern. **Subgrade** compaction for bikeways and paved walkways shall meet a minimum of 90 percent maximum density.

#### E. DRIVEWAYS may be surfaced as desired by the owner, except:

1. On curbed streets with sidewalks, driveway shall be paved with **portland** cement concrete Class 4000 from curb to back edge of sidewalk. See Drawings No. 3-004 and 3-005.
2. On shoulder and ditch section, driveway between edge of pavement and right-of-way line shall be surfaced as required by Drawing No. **3-003**.
3. On thickened edge roadways with underground utilities, **portland** cement concrete may be used for driveways between the thickened edge and the right-of-way line provided that a construction joint is installed at the right-of-way line.

#### F. STREET WIDENING/ADDING TRAVELED WAY TO EXISTING ROADS

1. When an existing asphalt paved street is to be widened, the edge of pavement shall be saw cut to provide a clean, vertical edge for joining to the new asphalt. After placement of the new asphalt section, the joint shall be sealed and the street overlaid one inch, plus a prelevel course, full width throughout the widened area. The requirement for overlay may be waived by the Engineer or Reviewing Agency based on the condition of existing pavement and the extent of required changes to channelization.

2. When an existing shoulder is to become part of a proposed traveled way a pavement evaluation shall be performed. This evaluation shall analyze the structural capacity and determine any need for improvement. Designs based on these evaluations are subject to review and approval by the Engineer or Reviewing Agency. The responsibility for any shoulder material thickness improvement shall be considered part of the requirement for roadway widening. The shoulder shall be replaced in width as specified in Sections 2.02, 2.03 and 2.04.
3. Any widening of an existing roadway, either to add traveled way or paved shoulder shall have the same surfacing material as the existing roadway.

#### 4.02 Requirements for Residential Streets on Poor Subgrade

The minimum material **thicknesses** indicated in Section 4.01 are not acceptable if there is any evidence of instability in the subgrade. This includes free water, swamp conditions, fine-grained or organic soil, slides or uneven settlement. If there are any of these characteristics, the soil shall be sampled and tested sufficiently to establish a pavement design that will support the proposed construction. Any deficiencies, including an R value of less than 55 or a CBR of less than 20, shall be fully considered in the design. Remedial measures may include, but are not limited to, a stronger paved section, a strengthening of **subgrade** by adding or substituting fractured aggregate, asphalt treated base, installing a geotextile, more extensive drainage or a combination of such measures. Both the soils test report and the resulting pavement design will be subject to review and approval by the Engineer or Reviewing Agency.

#### 4.03 Arterials and Commercial Access Streets

Any pavement **for** arterials and commercial access streets shall be designed using currently accepted methodology that considers the load bearing capacity of the soils and the traffic-carrying requirements of the roadway. Plans shall be accompanied by a pavement thickness design based on soil strength parameters reflecting actual field tests and traffic loading analyses. The analysis shall include the traffic volume and axle loading, the type and thickness of roadway materials and the recommended method of placement. Pavement sections shall not be less than those required for neighborhood collectors.

#### 4.04 Materials & Lay-Down Procedures: Shall be in accordance with **WSDOT/APWA** Standard Specifications and the following requirements:

- A. Crushed surfacing top and base courses may be substituted for a structurally equivalent thickness of ATB. The substitution ratio of crushed surfacing to ATB shall be **1.6:1**. Where base or top courses cannot be placed without possible contamination, then these courses shall be substituted by ATB.
- B. During surfacing activities utility covers in roadway shall be adjusted in accordance with Section 8.04.
- C. ATB may be used over isolated areas of unstable subgrade, providing the final **lift** of asphalt shall not be placed for a minimum of six months to allow time for the observation and repair of failures in the **subgrade** and ATB.

- D. Asphalt pavers shall be self contained, power propelled units. Truck mounted type pavers are not considered self propelled. Truck mounted pavers shall only be used for paving of irregularly shaped or minor areas as approved by the Engineer, or as follows:
1. pavement widths less than eight feet; and
  2. pavement lengths less than 150 feet.

#### 4.05 Pavement Markings, Markers, and Pavement Tapers

Pavement markings, markers or striping shall be used to delineate channelization, lane endings, crosswalks and longitudinal lines to control or guide traffic. Channelization plans or crosswalk locations shall be approved by the Traffic Engineer.

Channelization shall be required when through traffic is diverted around a lane or obstacle; and when connecting full width streets with different cross sections; and when extending an existing street with a new cross section different than the existing one. The channelization shall provide tapers equal in length to the posted speed limit times the distance in feet of diversion from the road centerline or the original alignment of travel, or the offset distance, as applicable. Channelization shall also be required to redirect traffic back to their original alignment.

Left turn channelization shall include a minimum of 150 feet of full width lane to include storage and a reverse curve 90 feet in length for posted speeds up to 45 mph. The reverse curve shall be 120 feet in length for posted speeds greater than 45 mph. The reverse curve may be included within the taper distance. A deceleration taper as shown in the WSDOT/APWA Standard Plans may be used in place of a reverse curve. Standard left turn lanes shall be 12 feet wide. Type 2L arrows shall be installed in the lane 25 feet and 100 feet behind the stop bar, crosswalk or stopping area. Additional storage may be required for long vehicles or anticipated left turn queues longer than the minimum storage.

Centerline for channelization shall consist of two four-inch yellow lines with a four-inch separation. Type 2d lane markers shall be installed at 40 foot centers between the lines. Holding lines for additional lanes shall be eight-inch white lines with Type 2e lane marker on the inside of the lane at 20 foot centers. Edgelines for tapering thru traffic back to the original alignment shall consist of four-inch white lines.

Pavement markings for channelization shall be reflectorized hot or cold applied plastic. Extruded or sprayed markings shall be dressed with glass beads for initial reflectance. All materials shall have beads throughout the material to maintain reflectance while the material wears.

Where pavement widening less than 300 feet in length is abruptly ended and edge lines do not direct traffic to through lanes, Type 2e lane markers shall be installed at 10 foot centers near the end of the paved area at a 10:1 taper.

Crosswalks shall be installed at all intersections controlled by traffic signals and other areas approved by the Traffic Engineer. Crosswalks shall consist of sets of longitudinal lines eight inches wide by 10 feet and with eight-inch separation. A set of these lines shall be installed between each lane, between the wheel tracks in each lane and at the pavement edges.

All pavement markings shall be laid out with spray paint and approved by the Traffic Engineer before they are installed. Approval may require a three working day advance notice to have field lay-out approved by the Traffic Engineer or to make arrangements to meet the Traffic Engineer on site during the installation.